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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/356,532	07/19/1999	ELLIOT KARL KOLODNER	UK98093	7951

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EXAMINER

NGUYEN, DUSTIN

ART UNIT PAPER NUMBER

2154

DATE MAILED: 07/14/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

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# Office Action Summary

Application No.

09/356,532

Applicant(s)

KOLODNER ET AL.

Examiner

Dustin Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 05 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

1. Claims 1 – 26 are considered for examination.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9, 14-26 are rejected under 35 U.S.C. 103[a] as being unpatentable over Adl-Tabatabai et al. [ US Patent No 6317869 ], in view of Jagannathan et al. [ US Patent No 5692193 ].

4. As per claim 1, Adl-Tabatabai discloses the invention substantially as claimed including method of managing memory in a multi-threaded processing environment including local thread stacks and local thread heaps, and a global heap, said method comprising:

creating an object in a thread heap [ col 5, lines 13-15 ].

Adl-Tabatabai does not specifically disclose

for a given thread, monitoring each object in its heap, to determine whether the object is accessible by any thread other than the given thread.

Jagannathan discloses

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for a given thread, monitoring each object in its heap, to determine whether the object is accessible by any thread other than the given thread [ col 12, lines 65-col 13, lines 27; and col 21, lines 26-36 and lines 58-65 ].

It would have been obvious to a person skill in the art at the time the invention was made to combine the teaching of Adl-Tabatabai and Jagannathan because Jagannathan's teaching of monitoring object in the heap would allow each thread to perform garbage collection independently of one another [ Jagannathan, col 5, lines 11-20 ].

5. As per claim 2, Adl-Tabatabai discloses assigning a status to the given object, the status designating the object as a local object [ col 6, lines 5-37 ].

6. As per claim 3, Adl-Tabatabai discloses deleting from the thread heap one or more local objects when it is determined that they are not accessible from a local root [ col 7, lines 29-46 ].

7. As per claim 4, Adl-Tabatabai does not specifically disclose changing the status of the object to global when the monitoring step determines that the object is accessible from either of a global root or other global object. Jagannathan discloses changing the status of the object to global when the monitoring step determines that the object is accessible from either of a global root or other global object [ col 21, lines 44-48 ]. It would have been obvious to a person skill in the art at the time the invention was made to combine the teaching of Adl-Tabatabai and Jagannathan because Jagannathan's teaching of changing the status of the object would free up space in memory for other object to be created.

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8. As per claim 5, Adl-Tabatabai discloses changing the status of an object in the thread heap to global if the object is assigned to a static variable or if the object is assigned to a field in a global object [ col 5, lines 29-30 and lines 43-44 ].

9. As per claim 6, Adl-Tabatabai discloses intercepting assignment operations to an object in the thread heap to determine whether the object status should be changed [ 540, Figure 5B ].

10. As per claim 7, Adl-Tabatabai discloses the multithreaded processing environment is a virtual machine [ 330, Figure 3 ].

11. As per claim 8, Adl-Tabatabai discloses the virtual machine comprises an interpreter comprising a write operation code modified to perform a checking of assignment of the object [ 331, Figure 3 ].

12. As per claim 9, Adl-Tabatabai discloses a just in time compiler wherein native compiled write operation code includes native code to perform the checking of assignment of the object [ 333, Figure 3 ].

13. As per claim 14, Adl-Tabatabai discloses certain objects are associated with a global status on creation thereof [ col 5, lines 29-30 ].

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14. As per claim 15, Adl-Tabatabai discloses certain objects include class objects [ col 5, lines 3-7 ].

15. As per claim 16, Adl-Tabatabai discloses the step of analyzing whether an object is likely to be made global and associating such an object with a global status on creation [ col 4, lines 58- col 5, lines 9 ].

16. As per claim 17, Adl-Tabatabai discloses the allocating objects assigned as global on creation to the global heap [ col 5, lines 63-65 ].

17. As per claim 18, it is apparatus claimed of claim 1, it is rejected for similar reasons as stated in claim 1. Furthermore, Jagannathan discloses a local thread stacks and heaps, and a global heap [ 31, 33, 35, Figure 5 ].

18. As per claim 19, it is rejected for similar reasons as stated in claims 4 and 5.

19. As per claim 20, it is rejected for similar reason as stated above in claim 3.

20. As per claim 21, it is rejected for similar reason as stated above in claim 5.

21. As per claims 22-26, they are program product claimed of claims 1-5, they are rejected for similar reasons as stated above in claims 1-5.

22. Claims 10-13 are rejected under 35 U.S.C. 103[a] as being unpatentable over Adl-Tabatabai et al. [ US Patent No 6317869 ], in view of Jagannathan et al. [ US Patent No 5692193 ], and further in view of Dice et al. [ US Patent No 6308315 ].

23. As per claim 10, Adl-Tabatabai and Jagannathan do not specifically disclose the spare capacity in an object header for the status. Dice discloses the spare capacity in an object header for the status [ col 6, lines 35-38 ]. It would have been obvious to a person skill in the art at the time the invention was made to combine the teaching of Adl-Tabatabai, Jagannathan and Dice because Dice' teaching of using object header for the status would let the system to perform garbage collection faster and more precise.

24. As per claim 11, Adl-Tabatabai discloses using multiples of 2 or more bytes in a thread heap to store the objects [ col 5, lines 5-7 ].

25. As per claim 12, Jagannathan discloses moving objects whose status is global from the thread heap to the global heap [ col 14, lines 39-42 ].

26. As per claim 13, Adl-Tabatabai discloses compacting the reachable local objects in a thread heap [ col 2, lines 30-32 ].

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27. A shortened statutory period for response to this action is set to expire **3 (three) months and 0 (zero) days** from the mail date of this letter. Failure to respond within the period for response will result in **ABANDONMENT** of the application (see 35 U.S.C 133, M.P.E.P 710.02, 710.02(b)).


***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dustin Nguyen whose telephone number is (703) 305-5321. The examiner can normally be reached on Monday – Friday (8:00 – 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (703) 305-9678.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directly to the receptionist whose telephone number is (703) 305-3900.

Dustin Nguyen

  
**ZARNI MAUNG**  
**PRIMARY EXAMINER**